Lower South Fork Coquille
Watershed Analysis

Bureau of Land Management

Coos Bay District

Myrtlewood Resource Area

First Iteration: April 1996

Resource Area Interdisciplinary Team Members

Michael S. Kellett - Fisheries Biologist (Team Lead)
Steve Langenstein - Wildlife Biologist
Estella Morgan - Natural Resource Technician (Botany)
Dale Stewart - Soil Scientist
Earl Burke - Fuels Specialist
Dave Sherman - Silviculturist
Dan Carpenter - Hydrologist
Steve Fowler - Engineer

Table of Contents

Figures: Page

Tables:

Introduction

Watershed analysis is a major component of the ecosystem-based management strategy mapped out in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (USDI 1994a). The stated purpose of watershed analysis is to develop and document a scientifically-based understanding of the ecological structures, functions, processes, and interactions occurring within a watershed, and to identify desired trends, conditions, data gaps, and restoration opportunities. The information, recommendations and data gaps documented in a watershed analysis can be used to help plan land management activities that are appropriate for the analysis area, support the NEPA process, and direct future data collection efforts. Watershed analysis was designed as an iterative process, with reports being revised as additional information becomes available.

This is the first iteration of Lower South Fork Coquille Watershed Analysis. The interdisciplinary team members initially convened to identify issues pertinent to the analysis area, then worked independently to produce "specialist reports", covering the issues identified in their respective fields of expertise. Upon completion of these specialist inputs, the team reconvened to critique and edit them, and synthesize the information into a cohesive watershed analysis report. The table of contents reflects the team's consensus for the report format. The report is organized such that each successive chapter answers the question "so what?", and presents a logical progression from a description of key physical and biological components, through discussions of past and present resource conditions and the processes affecting them, to desired future conditions and recommendations on how to achieve them. The team also agreed to preserve all of the specialist inputs in an appendix, to provide additional information, clarify certain portions of the report, and serve readers with a specific interest or focus.

Description

Location

The Lower South Fork Coquille watershed encompasses the area around Powers, Oregon, and includes most of T30S, R12W, T31S, R12W, and portions of adjacent townships (see location map Figure 1). The total size of this watershed is 65,669 acres. Federal land within this watershed is managed by the Myrtlewood Resource Area of the Coos Bay District - BLM (7,368 acres), and the Powers Ranger District of the Siskiyou National Forest - USFS (4,235 acres). The remainder of the watershed (54,066 acres) is privately owned. The Lower South Fork Coquille analysis area includes the Rowland-Baker-Salmon Tier 1 Key Watershed, which covers 24,055 acres. The Key Watershed acreage includes 5,750 acres managed by the BLM, 4,235 acres managed by the USFS, and 14,070 acres in private ownership.

Geology

The South Fork Coquille Analytical Watershed lies on the boundary between the Coast Range Physiographic Province and the Klamath Mountain Physiographic Province (see Figure 2). The Coast Range Province was part of a large, partially enclosed basin called a geosyncline. Vast amounts of submarine basalt flows, breccias, and tuffaceous sediments were deposited in this geosyncline during past volcanic activity. These flows and deep water sediments constitute the Roseburg Formation. The various sedimentary layers of Tyee Basin, which comprises most of the southern portion of the Coast Range Physiographic Province, sit atop this basaltic basement rock.

The Klamath Mountain Physiographic Province borders the Coast Range Province on the south, and extends into California as far south as San Francisco.

There are five geologic formations and thirteen various members of those formations and other deposits outcropping within the South Fork Coquille Watershed. From the oldest formation to the youngest they are: the Galice, the Humbug Mountain, the Otter Point, the Roseburg, and the Lookingglass Formations. Small deposits of quaternary terrace and alluvial material fill some of the larger stream valleys. Additional information on the geology of the analysis area is provided in Appendix 7.

Soils

The Lower South Fork Coquille watershed is composed of four major map units. Each unit is a unique feature in the watershed. Typically, the map unit consists of one or more major soils or included minor soils that share common associations. For this watershed the following map units are described within the Coos County Soil Survey of 1989: Rinearson - Etelka, Etelka - Whobrey, Digger - Preacher - Remote, and Serpentano - Digger classifications. Soil series for the basin are presented in Figure 3.

Figure 1. Location of the Lower South Fork Coquille Watershed.

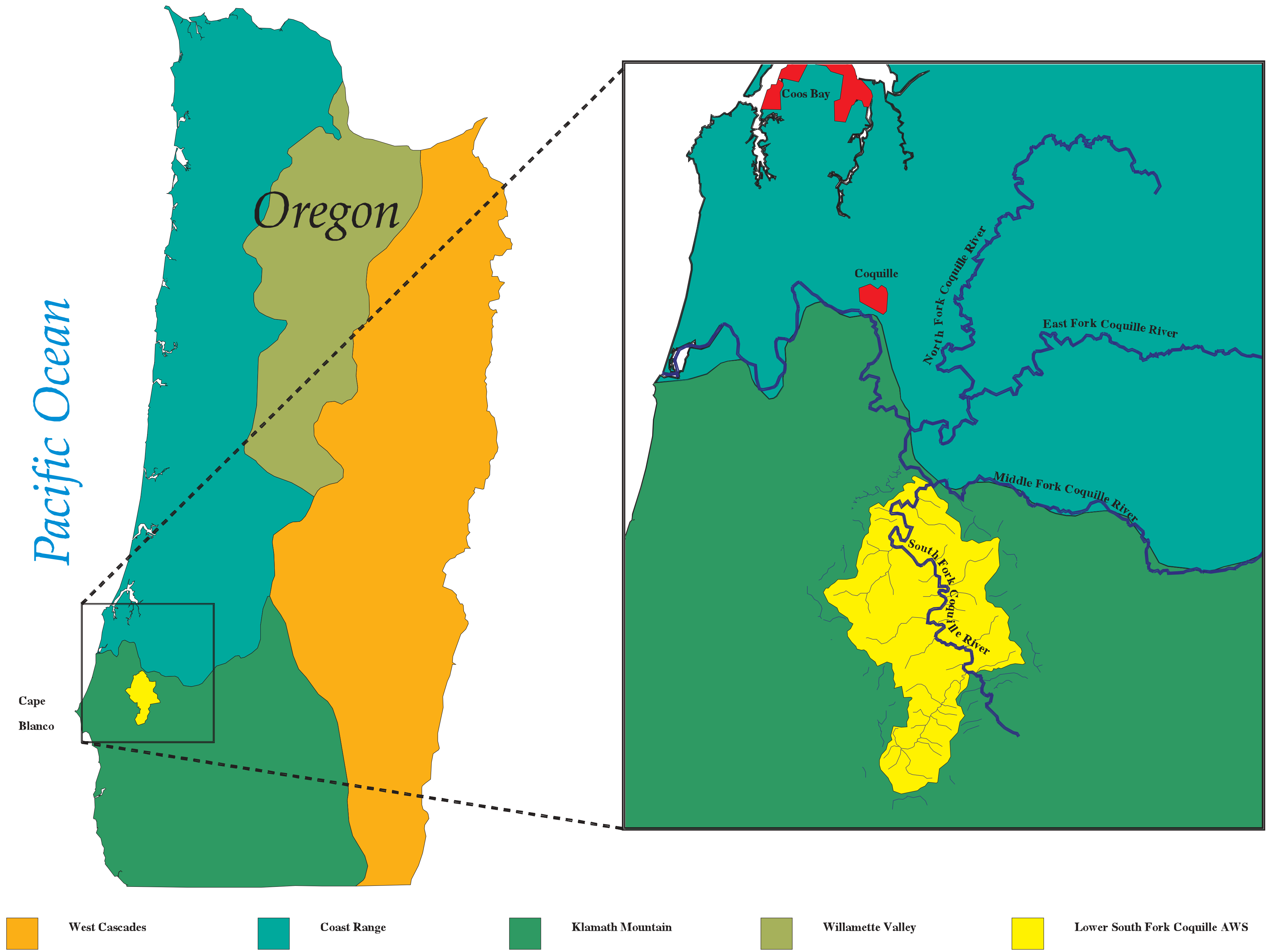
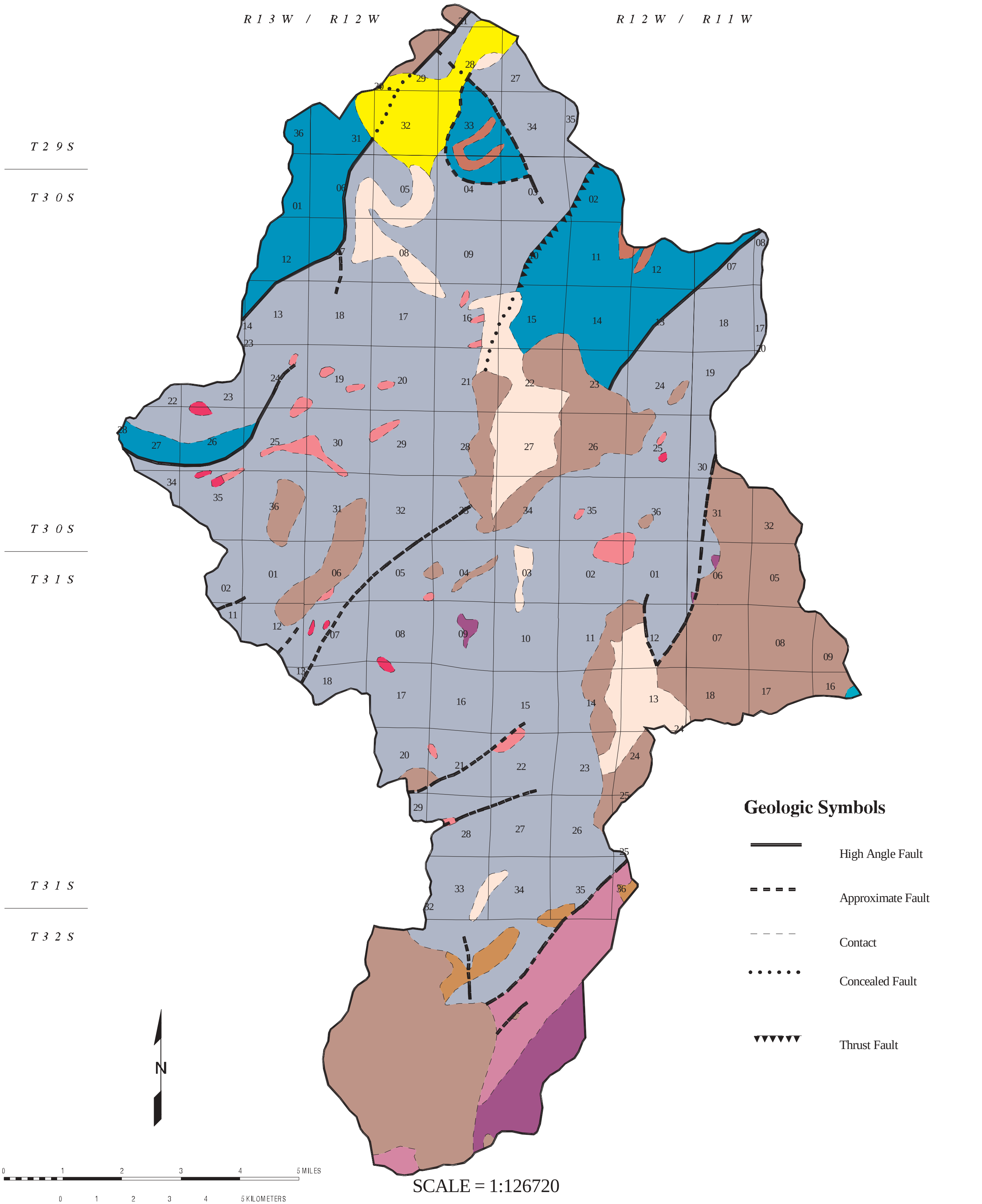


Figure 2. Geologic map of the Lower South Fork Coquille Watershed



Legend for Lower South Fork Coquille Watershed Geology Map

Quaternary Alluvial Deposit [Qal]: Consisting of varying proportions of unconsolidated clay, silt, sand and gravel.

Quaternary Terrace [Qt]: Elevated deposits of loosely compacted rudely bedded sand and minor gravel with subordinate organic matter found locally.

Tyee Formation [Tet]: Thick sequence of rhythmically bedded micaceous sandstone and siltstone.

Lookingglass Formation [Telg]: Rhythmically bedded non-micaceous sandstone and siltstone; basal beds are coal-bearing and conglomeratic locally near the base of the section.

Roseburg Formation [Ter]: A thick sequence of sandstone and siltstone; rhythmically bedded locally containing minor conglomerate and massive sandstone.

Roseburg Formation [Terv]: As above with large sub-units composed of pillow and brecciated submarine basalts.

Humbug Mountain Conglomerate [Khm]: Conglomerate containing clasts of chert, schist, diorite, greenstone and sandstone.

Otter Point Formation [Jop]: Composed of primarily sheared sedimentary rock.

Otter Point Formation [Jov]: As above with subordinate volcanic strata.

Otter Point Formation [Js]: As above with areas of serpentine and bodies of blueschist, also known as the Colebrooke Schist.

Serpentinite [Jsp]: A greenish soft rock composed of minerals of the serpentine group; an alteration product of ultramafic rocks, such as peridotite, occuring as concordant sheets a
nd tectonically emplaced dikes.

Galice Formation [Jgv]: Dark gray, fissile mudstone and siltstone interbedded with thin beds of fine-grained sandstone with subordinate volcanic rocks.

The Lower South Fork Coquille watershed is a unique basin with regard to the complexity of soil types. It has a spectrum of soils derived from sedimentary rock that are either coarse and well drained, or have a very fine silty clay component that are a barrier to infiltration and drainage. In addition, there are soils that come from a marine environment that are very old and weathered, with naturally reduced productivity.

Physiography

The Coquille River is the largest individual watershed in the South Coast River Basin, draining some 1058 square miles from the Coast Range and Siskiyou mountains, westward to the Pacific Ocean. The South Fork Coquille River is the largest of four tributaries of the Coquille River, having a drainage area of 245 square miles. This major tributary of the Coquille flows generally northward, originating in the Siskiyou mountains. The South Fork Coquille mainstem is 63 miles long, with an elevation change of 2930 feet, for an average gradient of 47 feet/mile.

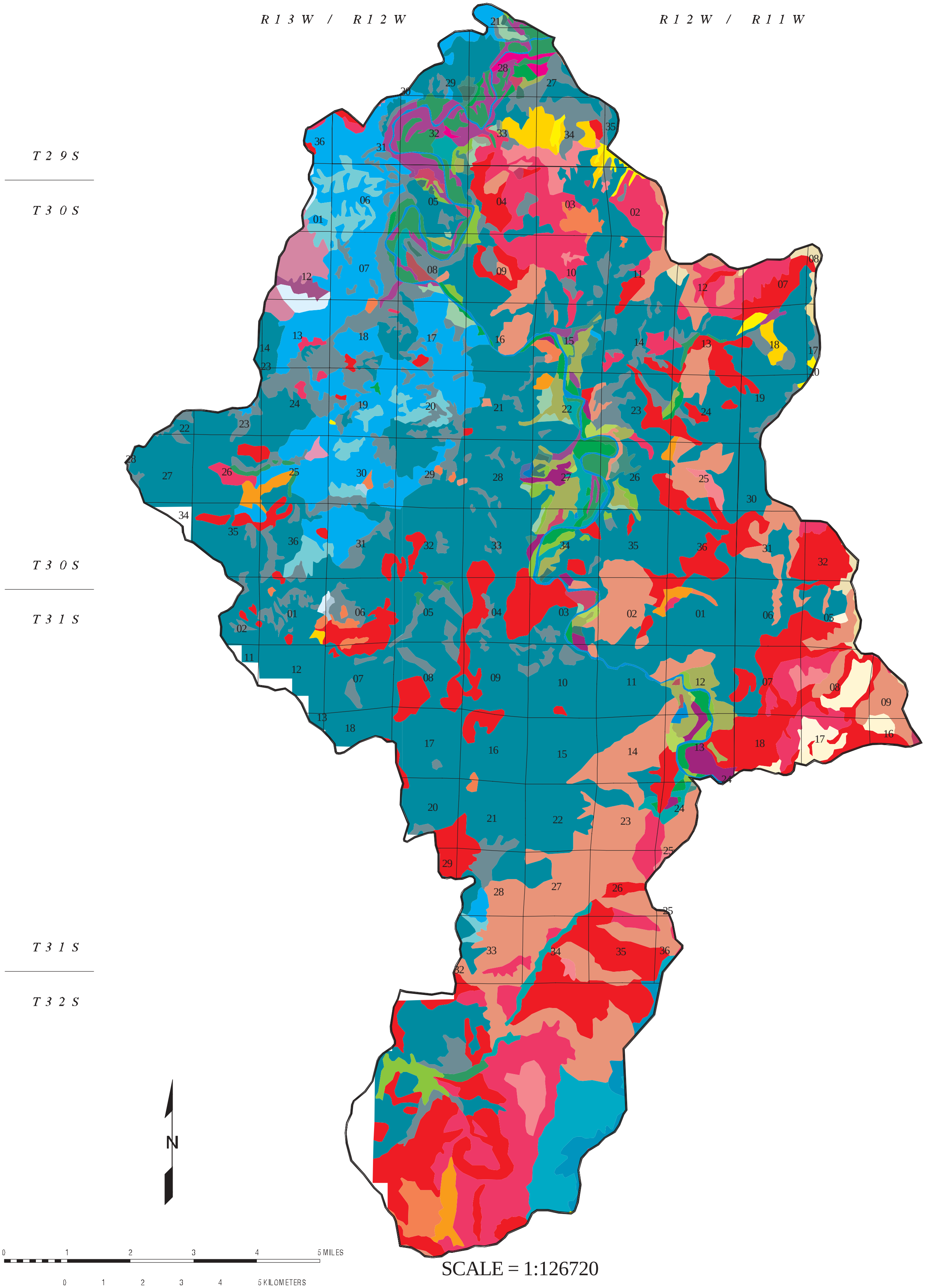
The watershed analysis area involves 36% of the South Fork Coquille watershed from the confluence of the Middle Fork Coquille River to Mill Creek near Powers, Oregon. Major tributaries in the Lower South Fork Coquille watershed analysis area are shown in Figure 4. Individual drainage areas are shown in Table 1.

Table 1. Areas of Lower South Fork Coquille tributary drainages.

Watershed Drainage	Acres	$Miles^2$
Baker Creek	3784	5.9
Dement Creek	7661	12.0
East Powers	2110	3.3
Mill Creek	1440	2.3
Powers	22886	35.6
Rowland Creek	6070	9.5
Salmon Creek	4627	7.3
Woodward Creek	3424	5.4
Yellow Creek	4092	6.4
Total	56094	87.7

Upstream from the confluence with the North Fork Coquille, the river meanders through a wide, flat valley, at first tidally influenced, and is joined by the Middle Fork Coquille at river mile 4.5. In the next 20 miles the South Fork climbs 200 feet gradually, meandering past the communities of Broadbent and Gaylord. Agricultural uses predominate in this section of the river. The river is quite level (gradient less than 1%), and wide, with large gravel bar deposits, limited large wood and little shade. Continuing upstream, the river climbs at a steeper rate, passing Roland, Baker and Salmon Creeks. The sharpest transition is between river mile 45-50, the Coquille Falls reach, where the valley rises 1000 feet. Toward the upper South Fork above Rock Creek, the river channel heads eastward, and climbs

Figure 3. Soil Type Map for the Lower South Fork Coquille Watershed



Legend for Lower South Fork Coquille Watershed Soil Map

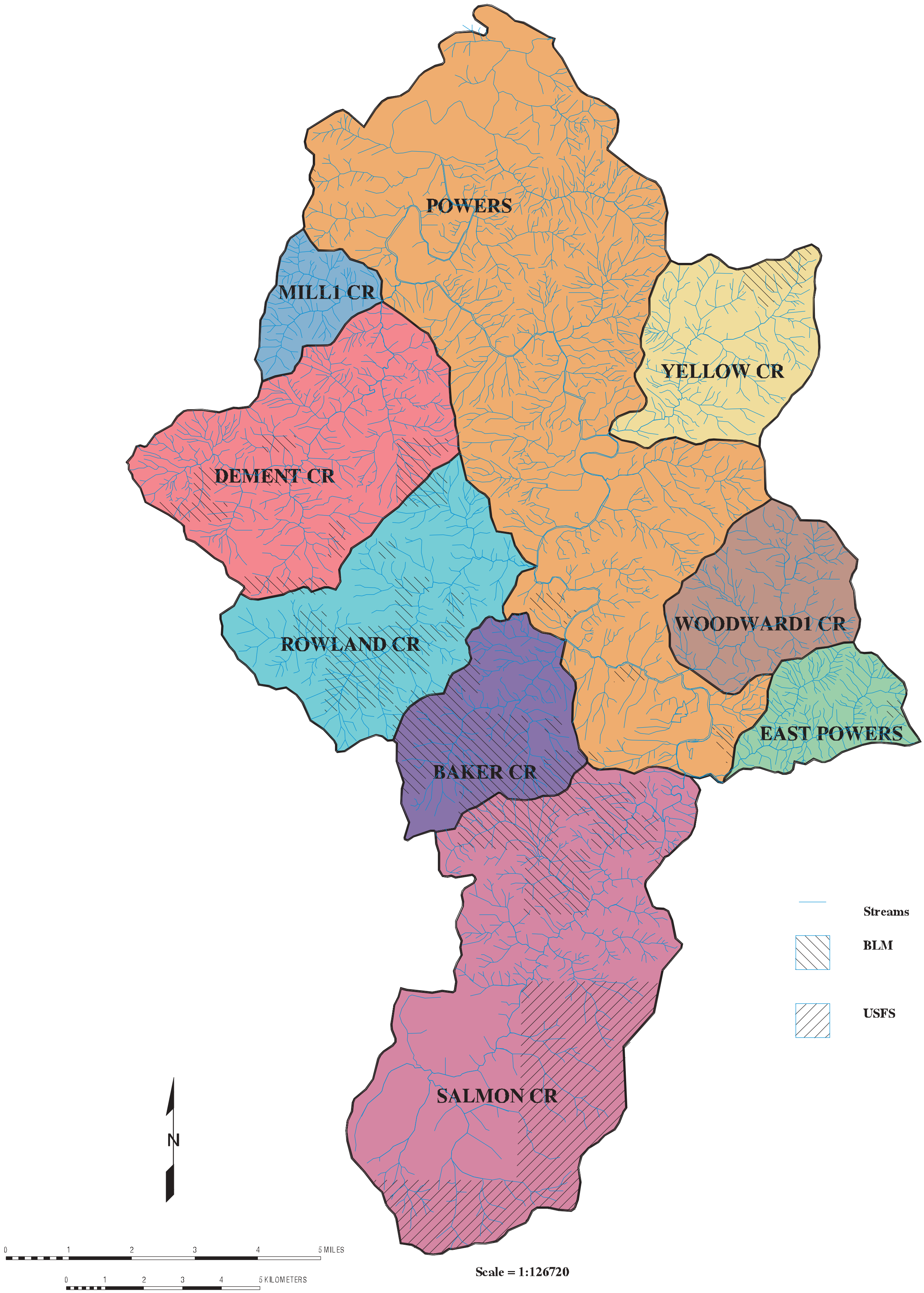
- Coos County -

9
10A
10B
10C
13D
13E
13F
57
48
14F
15F
49E
49F
50D
50E
58F
No Data

17B
24
25
33
36C
36D
37C
47B
63B
63C
63D
65
44D
44E
45D
45E
46D
46E

18E
19F
20C
20D
20E
21D
22E
51D
51E
53D
53E
W

Figure 4. Map of surface water, drainages and ownership in the Lower South Fork Coquille watershed.



through Eden ridge, and enters Eden valley. The basin headwaters are at the upstream terminus of this valley feature.

Streams in the analysis area show mostly a dendritic (branching) pattern. About 670 miles of streams are found in the Lower South Fork Coquille watershed, for a drainage density of 7.62 mi/mi^2 (refer to Table 2). It is estimated that 80% of the total stream miles (generally 1^{st}-2^{nd} order) are intermittent; 20% are perennial. Based on this distribution, approximately 128 miles of stream channels within the analysis area contain some water throughout the year, in most years.

Table 2. Miles of stream by stream order and stream density for Lower South Fork Coquille drainages.

Drainages	Miles of Stream by Stream Order [1]							
	1	2	3	4	5	6	7	Total
Baker Creek	19.5	11.4	2.8	3.2	1.2			38.1
Dement Creek	64.8	22.7	8.5	3.8	5.3			105.1
East Powers	25.0	7.5	1.9	3.1	1.0			38.5
Mill1 Creek	14.2	2.8	1.5	1.9	0.6	0.1		21.1
Powers	142.0	66.0	25.4	6.3	1.8	17.1	4.7	263.3
Rowland Creek	36.6	12.1	6.4	4.0	0.9			60.0
Salmon Creek	25.9	14.9	4.4	3.1	4.9			53.2
Woodward1 Creek	24.0	9.9	3.5	2.5	1.5			41.4
Yellow Creek	30.6	11.0	3.4	1.9	2.3			49.2
Stream Density (mi/mi^2)	4.40	1.80	0.65	0.34	0.22	0.20	0.05	7.60
Total stream miles								669.90

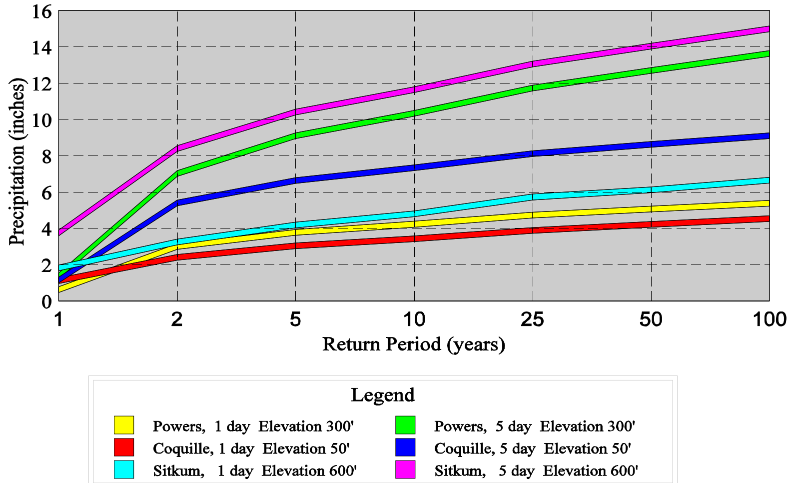
[1]Relative positions of streams, where all exterior links are order 1, and proceeding downstream, the confluence of two like orders result in existing stream order + 1. The junction of two different orders retain the higher order and the main stream always has the highest order (Strahler 1957).

Climate

Annual precipitation occurs mostly as rainfall, ranging from 55 inches in the low elevations and river valleys from the mouth to the Gaylord area, to over 120 inches on the divide between Johnson and Rock Creeks (OWRD 1963). Cool, moist air masses rising over the Siskiyous produce snow at times over 1800-2000' elevations. Annual snowfall averages 3 inches at Powers (elevation 300 feet), and 40+ inches in the higher portions of the watershed (OWRD 1963). These are intermittent snowpacks, usually persisting on the ground for only a few weeks, and sometimes melting quickly with warm winds and rain.

Close to 80% of the average annual precipitation occurs between October and March, with 50% occurring during November-January. Precipitation during the summer months is only about 4% of the annual average. Average dry season precipitation, from May through September varies from 6 inches between Myrtle Point and Powers, to 12 inches on Eden Ridge (OSU 1982).

Figure 5. Maimum precipitation estimates for the Lower South Fork Coquille Watershed.



Maximum precipitation periods are responsible for high runoff, including flooding, watershed erosion, and slides and debris torrents - but occur on an infrequent basis. High precipitation with existing shallow snowpacks can worsen flooding. Maximum precipitation estimates are shown for the analysis area in Figure 5. Results are based on a frequency analysis taken from area NOAA Cooperative Weather Stations. Differences in elevation strongly affect precipitation amounts. Generally, damaging storms have a return frequency of 5 years or more.

Botanical Resources

The vegetation of the Lower South Fork Coquille Watershed is a mosaic of early to late seral stage forests, oak woodlands, and agricultural lands. The watershed consists of two distinct vegetative zones with an additional vegetation type interspersed within both zones. The western hemlock (*Tsuga heterophylla*) zone is the major vegetational zone in this watershed, encompassing all but Johnson Mountain, where the mixed-evergreen forest type dominates the serpentine soils. White oak (*Quercus garryana)* woodlands are an integral component of the vegetational zones throughout the entire watershed.

Riparian Areas

The riparian reserves are areas along all streams, wetlands, ponds, lakes and unstable areas where riparian-dependent resources receive primary emphasis. The main purpose of these reserves is to protect the health of the aquatic system and its dependent species, while also providing benefits to upland species. General guidelines for interim riparian reserve widths are described in the Aquatic Conservation Strategy of the Standards and Guidelines (USDI 1994a).

Riparian reserves occupy approximately 3,825 acres (52%) of BLM land and 1,183 acres (28%) of USFS land within Lower South Fork Coquille Watershed, and approximately 3,019 acres (53%) of BLM land and 1,183 acres (28%) of USFS land within the Rowland-Baker-Salmon Key Watershed. Additionally, according to standards in the Oregon State Forest Practices Act, riparian reserves comprise approximately 1,565 acres (3%) of the private land in the Lower South Fork Coquille Watershed. (Note: The riparian reserve acreage given for USFS land is probably an underestimate resulting from incomplete GIS data on the stream network in the Salmon Creek drainage.)

Wildlife and Wildlife Habitat

Generally, the western Oregon forests are an unquantified mosaic of dynamic vegetation types affected over time by disturbances such as human activities, fire, logging, wind storms, disease, and more. Natural conditions, such as slope, aspect, elevation, soils, temperature and precipitation, also add influences to the development of the these forests. These influences directly affect the types, qualities, quantities, sizes, spacial and temporal relationships of the various wildlife habitats found within the vegetation types of these forests. For the wildlife resources in the Lower South Fork Coquille Watershed, "vegetation type" and "timber type" are not equal to "habitat type". For example, a particular timber type within the forest, may or may not provide habitat with course woody debris. If there are logs present, they may be in an undesirable condition (fire hardened or other) and may not provide good wildlife (herptile or small mammal) habitat.

Riparian areas are among the most heavily used habitats for all wildlife species occurring in the forest lands of western Oregon, because they provide most of the requirements vital to these animals for some aspect of their lives; i.e., food, water and shelter. It was shown that 132 wildlife species use riparian areas for breeding and 193 species used riparian areas for feeding (Brown 1985). Riparian areas are sometimes used as travel corridors, and may be used for species dispersal. These sites also provide nesting and perching sites, particularly for those species which utilize the aquatic invertebrate populations as a prey base.

Some wildlife species are quite mobile, but still need habitats which are complete, and linked. These linkages are on a landscape as well as a local scale. On the landscape scale, diverse habitat types, representing the early, mid and late ecological seral stages are needed (FEMAT 1993). One decision of the Record of Decision (ROD) for the Northwest Forest Plan was to retain a minimum of 15 % of all federal forest lands in all watersheds in late seral condition (USDI 1994a). Forests representing multiple age classes, each with a variety of plant species (including shrubs) are assumed to be more healthy (Raphael 1988).

At the local scale, links between the various landscape components (uplands, riparian areas, ridges and draws) are examples of habitat connectivity. Many species traverse their ranges by traveling through several habitats. For example, deer, coyotes, skunks and others use many habitats for foraging. Some animals, such as salamanders, do not always travel parallel routes with streams, and often will take random perpendicular routes through upland habitats. Other groups of species, such as perching birds, use fewer habitats, and habitats similar to each other. These birds often travel from tree crown to tree crown, and avoid open areas or breaks in the habitat. These are reasons to maintain links between the terrestrial habitats and riparian habitats, and to retain micro-sites of suitable or imminently suitable habitats. Relatively small and immobile species are often susceptible to management actions when management units create barriers to the species' movements. Examples of barriers may include clear-cuts with insufficient reserve trees or down logs, and roads. Even when the riparian habitats connect the lowlands to the ridges, it does not necessarily ensure that the mid-slope habitats are retained.

The Key Watershed within this analysis area is so designated partly because of its value as a "Connectivity" area between the forests in the Middle Fork Coquille watershed to the north, and the Siskiyou National Forest to the south. The aquatic portion of this area is important, but may not have the significance of the terrestrial values for species like the Northern Spotted Owl and the Marbled Murrelet. The Rowland-Baker-Salmon Key Watershed is strategically located to include habitat for other special status species like the Del Norte Salamander, Red-Legged Frog, and others. This area is likely to be a critical physical/biological link for some species occurring in both the Coast Range and Klamath Mountains ecological provinces. Furthermore, some species have their ranges and distribution boundaries defined by where these two ecological provinces meet. With these significant values, the role this watershed plays in implementing the Northwest Forest Plan strategies is significant. If these linkages were lost or reduced, it may affect the loss or recovery of a species, and the level of success of the Forest Plan.

There is little available information about existing local wildlife populations, habitat quantities or qualities for non-game or non-listed (endangered or threatened) species within the analysis area, because there have been few specific inventories of wildlife or their habitats. Cooperative efforts with the Oregon Department of Fish and Wildlife (ODFW), the U.S. Forest Service - Powers Ranger District (USFS) and some of the local landowners have provided some insight into types, relative numbers and qualities of some wildlife and their habitats in the area. There are continuing Northern Spotted Owl and Marbled Murrelet surveys occurring in the area. The analysis area is primarily in private ownership, but existing survey data is exclusively from federally-administered land. ODFW general information about wildlife is from both public and private lands.

There are at least four significant categories of wildlife identified within the Lower South Fork Coquille watershed. These groups are presented without inference of priority, because from an ecological perspective, the loss or reduction of any of these groups is equally significant to the function of the forest community. The first is Birds, which includes neotropical migratory birds and resident birds of many scientific families. There are 151 species of birds which have been observed in the Siskiyou National Forest, Powers Ranger District, including 52 neotropical migrants (Webb & Shea 1991). It is likely that these species also occurred in the Lower South Fork Coquille Analytical Watershed historically (USDI 1994b, ODFW 1993b, National Geographic Society 1993). Second is Herptiles, including the amphibians and reptiles. According to literature, there should be approximately 15 species of amphibians (14 native, 1 exotic) and 14 (all native) species of reptiles occupying the habitats within the watershed (Nussbaum et. al. 1983 and Webb & Shea 1990a). Third are the Mammals, represented by large animals (Roosevelt Elk, Black Bear, Black-Tailed Deer, etc.), and small mammals, including furbearers (Mink, Otter, Raccoon, Bats etc.), small predators (Coyote, Fox etc.),and rodents (Squirrels, Chipmunks, Beaver, etc). It is estimated that at least 64 species of mammals historically (Maser et.al 1981 and USDA 1995) occurred within this watershed analysis area. No inventory has been conducted in the Lower South Fork Coquille to determine the current estimate of species numbers. However, the US Forest Service - Powers Ranger District lists 57 mammal species (Webb & Shea 1990b). Fourth, there are the special status species. Although there have been few true inventories, the following 13 special status species are <u>known</u> to occur within this management area (USDI 1994d):

American Peregrine Falcon	Pileated Woodpecker
Marbled Murrelet	Foothill Yellow-Legged Frog
N. Goshawk	N. Red-legged Frog
Bald Eagle	Tailed Frog
Mountain Quail	W. Pond Turtle
N. Spotted Owl	S.Torrent Salamander
	Del Norte Salamander

Other special status species are also likely to occur. All total, at least twenty-five special status wildlife species probably occur, or historically occurred, within the analytical watershed (Guetterman 1993, Peterson & Powers 1952, and VanDyke 1995). This list of federal threatened, endangered, federal candidate, BLM sensitive, BLM assessment, and State of Oregon listed (threatened/endangered) species includes birds, reptiles, amphibians, and mammals (USDI 1994c and USDI 1994d). Two known Northern spotted owl nest sites occur in this analytical watershed. Some suitable habitat for most or all of the species listed above and below, likely still occurs within the watershed. However, at this time there is no accurate way to describe the amount, quality, or location of these habitats. The following 12 additional special status species should occur, or have historically occurred, in the watershed, although many of these species are unconfirmed for lack of inventory (USDI 1994d and Maser 1981):

Arctic Peregrine Falcon	W. Big-eared Bat
Merlin	White-footed Vole
Loggerhead Shrike	Purple Martin
Common Loon	Pacific Fisher
American Marten	Grizzly bear
Wolves	Lynx

An entire species list for all animals in the District can be found in the Coos Bay District RMP. This list is not specific to the Lower South Fork Coquille watershed, and no specific list can be accurately produced without a concentrated and intensive inventory.

Fisheries

There are approximately 56 miles of anadromous fish-bearing streams in the Lower South Fork Coquille watershed; 19 miles (33%) lie within the Rowland-Baker-Salmon Key Watershed. These stream miles include spawning and rearing habitat, as well as migration routes. Approximately 36 additional stream miles are inhabited only by resident fish (primarily cutthroat trout), which brings the total to approximately 91 miles of fish-bearing streams in the Lower South Fork Coquille watershed; 32 miles (35%) of which lie within the Rowland-Baker-Salmon Key Watershed. Fish-bearing streams are shown in Figure 6. The fish distribution map (Figure 6) is a composite of maps and records obtained from BLM, ODFW (Forsberg 1992), and the Oregon State Forestry Dept. (ODF), and indicates the furthest upstream endpoint noted among the source materials for resident and anadromous fish in each stream. It should be noted that although the majority of the stream miles in the analysis area are classified as non-fish-bearing, they do provide habitat for a wide variety of mammals, birds, herptiles, and invertebrates, which are equally important parts of the aquatic ecosystem. The distribution of anadromous, resident, and non-fish-bearing stream miles within the analysis area are shown in Figure 7. Populations of introduced fish species may exist in ponds within the watershed, but were not evaluated in this analysis.

Figure 7. The distribution of anadromous, resident, and non-fish-bearing stream miles in the Lower South Fork Coquille River watershed.

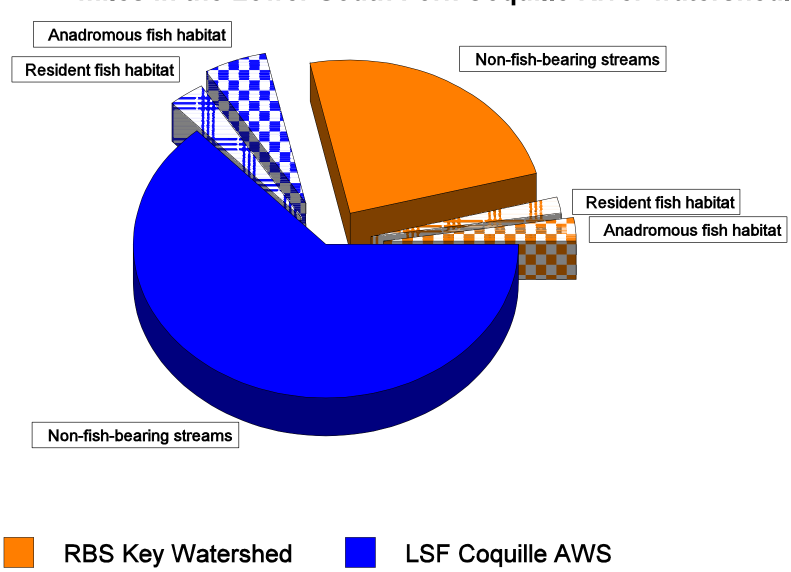
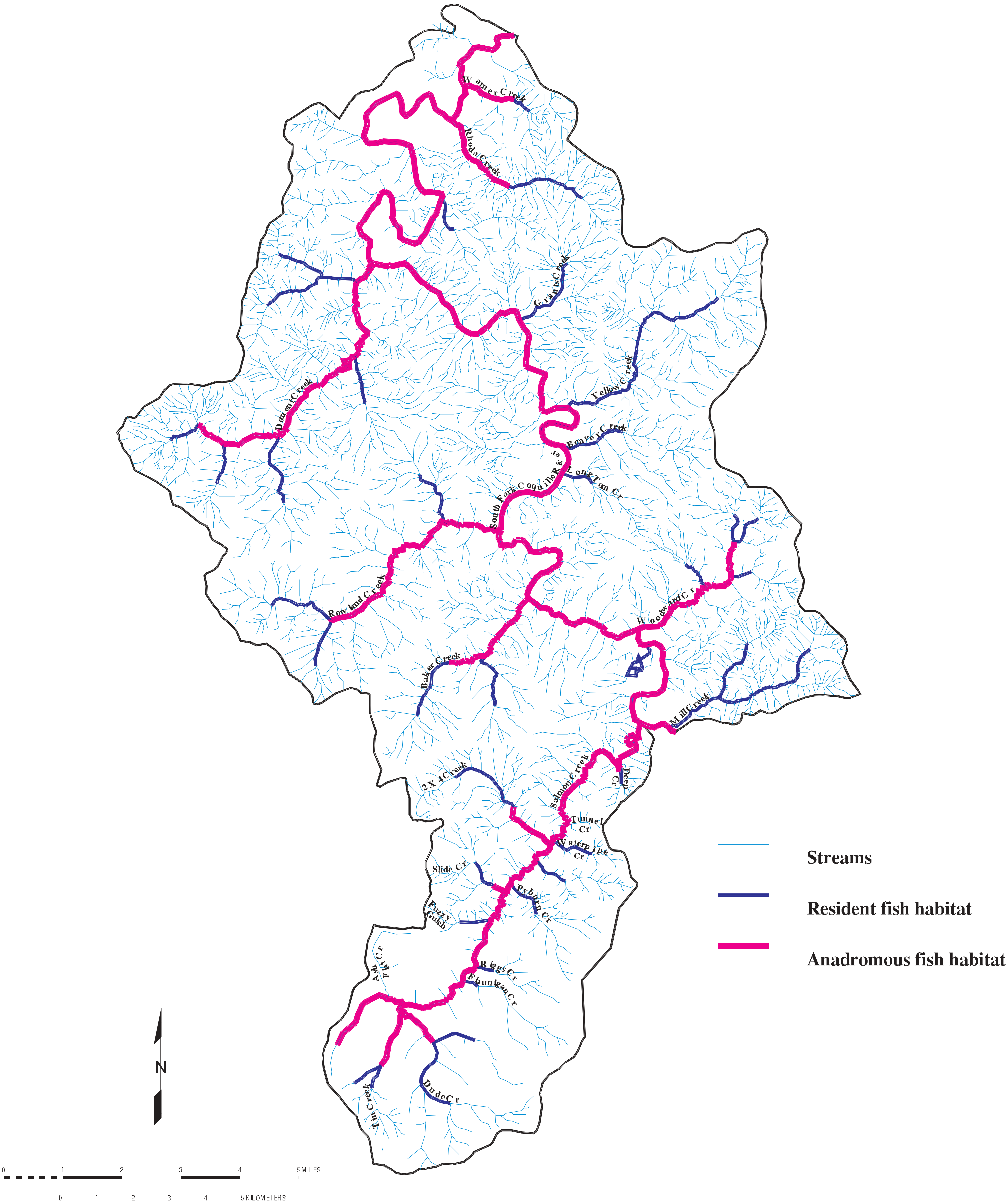


Figure 6. Fish-bearing streams in the Lower South Fork Coquille Watershed.



The following fish species occupy the Rowland-Baker-Salmon Key Watershed during all or part of their respective life cycles (as verified during spawning-ground/habitat surveys, electro-fishing, or anecdotal accounts):

Chinook salmon (fall)	*Oncorhynchus tshawytscha*
Coho salmon	*Oncorhynchus kisutch*
Cutthroat trout	*Oncorhynchus clarkii*
Largescale sucker	*Catostomus macrocheilus*
Pacific lamprey	*Lampetra tridentata*
Prickly sculpin	*Cottus asper*
Rainbow trout	*Oncorhynchus mykiss*
Reticulate sculpin	*Cottus perplexus*
Speckled dace	*Rhinichthys osculus*
Steelhead (winter)	*Oncorhynchus mykiss*

In addition to those listed above, the remainder of the Lower South Fork Coquille watershed supports the following:

Chinook salmon (spring)	*Oncorhynchus tshawytscha*
Threespine stickleback	*Gasterosteus aculeatus*

Issues and Key Questions

The interdisciplinary team identified the following issues and key questions for analysis:

Issue #1: Soil Productivity - The current productivity of the soil needs to be maintained so as not to reduce the resource by erosional processes, nutrient losses or growth potential.

- ❖ What is the natural rate of landsliding within the Tier 1 Watershed?
- ❖ What types of landslide processes are active in the watershed?
- ❖ Have management activities played a major role in producing landslides above the natural rate within the Tier 1 watershed.
- ❖ What remedial action could be taken in the watershed to improve conditions that may result in landslides?
- ❖ Is culvert placement and drainage adequate to prevent landsliding in the Tier 1 watershed?
- ❖ What is the current status of the site productivity within the watershed?
- ❖ Has soil productivity suffered a loss through past management practices?
- ❖ What soil components are most prone to degradation and result in lower site productivity?
- ❖ Is compaction of the watershed hindering soil or plant functions in the watershed?
- ❖ What level of compaction due to roads and other management activities exists within the watershed?
- ❖ What is the response of the watershed to storm events in regard to producing sediment?
- ❖ How quickly can the watershed recover from the affects of sedimentation after a major storm event?

Issue #2: Some water quality characteristics in the Lower South Fork Coquille and tributaries, including temperature and dissolved oxygen, do not fully support beneficial uses or meet Oregon DEQ Water Quality Standards for the South Coast Basin (OAR 340-41.325).

- ❖ What factors are affecting water quality that can be influenced by BLM or federal land management?

- ❖ What are the processes delivering sediment to tributary streams and along the main river?

- ❖ Where is stream turbidity or stream sedimentation been identified as a problem, or is suspected to interfere with beneficial uses?

- ❖ What are the processes that are increasing summer stream water temperatures above State DEQ Water Quality Standards? Which stream segments have frequent exceedances?

- ❖ What are the processes, including human activities, that are causing dissolved oxygen in the mainstem to fall below State DEQ Water Quality Standards? Are tributary streams affected?

- ❖ What are the processes, including human activities, that are causing fecal coliform in the mainstem to exceed State DEQ Water Quality Standards? Are tributary streams affected?

- ❖ Has water quality been adversely affected by changes in water quantity or timing as a result of settlement and human activities in the watershed?

Issue #3: Water quantity is insufficient during summer through early fall periods to fully support beneficial uses.

- ❖ Have summer low flows changed as a result of settlement and human activities in the watershed?

- ❖ How much surface water is being used for out of stream uses, and where are points of diversion? What affect does this have on available summer flow?

- ❖ What effect have changes in channel morphology and riparian vegetation had on summer low flows?

- ❖ What is the cause of summer channel drying in Rowland Creek?

- ❖ What factors are affecting lack of sufficient summer flow that can be influenced by BLM or federal land management?

- ❖ Where are the domestic water sources?

Issue #4: Upland vegetation - Changes have occurred in native plants, plant communities and natural landscape pattern since the inception of large scale use and management of the land for the production of various commodities used by a growing society.

- ❖ What activities have contributed to changes in natural plant distribution, composition, abundance, and landscape patterns?

- ❖ Where and how abundant are the various natural plant communities, including old growth communities, and are any missing or represented by only small remnant populations?

- ❖ What potential management options and/or projects could be used to maintain and/or restore any degraded plants or plant communities?

Issue #5: Aquatic habitat condition

- ❖ What is the role of this watershed in the region?

- ❖ Is there sufficient large woody debris, adequately distributed throughout the system?

- ❖ Is there adequate spawning and rearing habitat?

- ❖ Are there obstructions to fish migration?

- ❖ Is the Key Watershed functioning as intended; i.e., providing refugia for the rest of the watershed?

- ❖ Given current conditions within this basin and given reasonably foreseeable events, will the Key Watershed continue to function as a refuge and a "seed source" over the time period required for the recovery of adjacent basins - that is, until it is no longer needed as a refuge?

- ❖ Where are the key habitats (hot spots); and how are they maintained?

- ❖ What forces have the potential to reduce or limit the viability of key habitats; i.e., what is the vulnerability of the aquatic habitat resource?

- ❖ What can be done about the threats to the integrity and productivity of the aquatic habitat within and outside the Key Watershed portion of this sub-basin?

Issue #6: Fish population status

- ❖ What fish species occupied this watershed historically?

- ❖ What species are there now, and how are they distributed?

- ❖ What are their population trends?

- ❖ Are the available spawning and rearing habitats fully seeded?
- ❖ What are the sensitive aquatic organisms in the sub-basin; and how are they doing?
- ❖ What are the social values of this resource?
- ❖ What is the role of the Key Watershed in this watershed?
- ❖ Given current conditions within this basin and given reasonably foreseeable events, will this basin function as a "seed source" over the time period required for the recovery of adjacent basins?
- ❖ What forces have the potential to reduce or limit the viability of existing fish populations; i.e., what is the vulnerability of this resource?
- ❖ What management activities would be necessary to reverse the [downward] trends or reduce the threats?

Issue #7: Riparian habitat condition

- ❖ How much of the riparian overstory is presently dominated by (a) shrubs, (b) hardwoods, (c) conifers, (d) mixed hardwoods & conifers?
- ❖ How were site factors and riparian overstory vegetation historically correlated?
- ❖ Where are the most intact riparian areas located?
- ❖ Is there adequate riparian canopy closure?
- ❖ Is there adequate potential for recruitment of large woody debris?

Issue #8: Wildlife populations and habitat condition

- ❖ What wildlife species were in the Lower South Fork Coquille watershed historically?
- ❖ What wildlife species (including special status species) are there today?
- ❖ What are the population trends: stable, increasing, decreasing?
- ❖ What kinds/how much wildlife habitat occurred in the past (by land ownership)?
- ❖ What kinds/how much wildlife habitat is currently available?

- ❖ What kinds of wildlife habitats should be managed for today?
- ❖ How much of each habitat is needed?
- ❖ How should habitat types be dispersed/arranged (spatially and temporally)?
- ❖ What is the understood health and function of this analysis area, related to wildlife?
- ❖ How are the habitats distributed between land owners?
- ❖ What is an acceptable level of habitat fragmentation for wildlife?
- ❖ What level of public access is appropriate for all of the wildlife resources?
- ❖ How are wildlife issues linked to other resource values?

Issue #9: Fire and disturbance

- ❖ What naturally-caused disturbances occurred in the watershed prior to 1924 (period of record); how big were they; and in what way did they alter vegetative characteristics?
- ❖ What and where were the human-caused disturbances prior to 1924, and what impact did they have on the character and composition of watershed?
- ❖ How and to what extent do we want to utilize disturbance to re-establish watershed characteristics?

Issue #10: The introduction and spread of Port-Orford-cedar root rot.

- ❖ What is the current distribution and level of infestation of POC root-rot in the watershed?
- ❖ What is the potential for the continued introduction and spread of the disease?
- ❖ What ecological processes would be altered should POC be lost, or populations greatly reduced in the ecosystem?
- ❖ What management opportunities are there for reducing the spread or helping to prevent the introduction of the disease into new areas?

Issue #11: Forest productivity

- ❖ What are the various economically and socially valuable plants and plant communities and their abundance and location?

- ❖ What is the potential supply of forest products?

- ❖ What are the past, present and future trends in value and demand for commercial products?

- ❖ What activities have contributed to changes in "natural" plant distribution, composition, abundance and landscape patterns?

- ❖ How could various harvest patterns and harvest levels of forest products influence other plants, animals, and ecological processes and functions?

- ❖ What are the past, present, and expected future demands on commercially valuable plants or plant communities in terms of their intrinsic, aesthetic, cultural and/or ecological restoration values?

Issue #12: Noxious weed spread

- ❖ What is the potential of noxious weeds to impact and spread within the watershed?

- ❖ What is the current status of the spread of the noxious weeds in the watershed?

- ❖ What is the current management for reducing the spread of noxious weeds within the watershed?

Issue #13: Status and condition of the current transportation system.

- ❖ What is the current use of roads within the watershed?

- ❖ What is the current road density, and how does it comply with the RMP?

- ❖ What is the future management of the road system to reduce sedimentation and other potential problems?

- ❖ Where are the roads that are contributing sediment to streams?